Government of Uganda

MINISTRY OF AGRICULTURE ANIMAL INDUSTRY & FISHERIES

DEPARTMENT OF FISHERIES RESOURCES ANNUAL REPORT 2010/2011

Final Draft

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LIST OF TABLES AND FIGURES

LIST OF ACRONYMS

BMU	Beach Management Units
DFR	Department of Fisheries Resources
DSIP	Development Strategy & Investment Plan
LVFO	Lake Victoria Fisheries Organization
LMO's	Lake Management Organization
MoFPED	Ministry of Finance Planning and Economic Development
PPP	Public Private Partnership
UFL	Uganda Fisheries Laboratory
NAFRRI	National Fisheries Resources Research Institute
LAGBIMO	Lake George Basin Integrated Management Organisation
LAKIMO	Lake Kyoga Integrated Management Organisation
QAFMP	Quality Assurance Fish Marketing Project
EU	European Union
UFPEA	Uganda Fish Processors and Exporters Association
ACP	African Caribbean and pacific Countries
AFALU	Association of Fishers and Lake Users
PCU	Project Coordination Unit

FOREWORD

The Department of Fisheries Resources (DFR) under MAAIF and Directorate of Animal Resources is the technical Department mandated to promote, support and guide the Fisheries Sector in Uganda. The Department also retains the responsibility for setting and enforcing the standards and regulations for practices pertaining to fisheries. The Department compiles data and information for its own use and for dissemination to stakeholders. This publication is an annual product to support evidence-based decision making, planning and assessing progress in the formulation and implementation of policy to better manage the fisheries resource.

Program 1 "*enhancing production and productivity*", program 2 "*improved market access and value addition*", program 3; "*improving enabling environment*" of the DSIP 2010/11 - 2014/15, are the driving pillars for the Department with the overall objective to achieve sustainability and poverty reduction among the fishing communities.

Collaboration from the Local Governments, Private Sector, Beach Management Units and collaborating agencies like NAFIRRI, LVFO, FAO, have enabled the publication of DFR annual report. Figures were compiled from Department reports among others.

The Department extends appreciation to all the institutions, BMU's, Project Coordinators who provided us with figures, data, as well as the information that was used in refocusing performance of the sector and general development of the clearer picture of what is happing the Fisheries Sub-Sector.

On behalf of the Ministry, I wish to express my appreciation for the financial support provided by GOU, under recurrent and more especially members of the core team, to towards compilation of information and data for this report and strengthening the process of developing the annual report for the Department.

V.R. Rubarema
Permanent Secretary

EXECUTIVE SUMMARY

Capture Fisheries

Fishing activities grew by 0.4 percent in 2010/11 compared to 2.6% growth registered in 2009/10. This was attributed to the fishing control measures imposed by the Department in the country. The Water Bodies Unit initiated the process of developing Lake Management Plans (LMP) aimed at improving management measures and curbing the decline of fishery resources in our water bodies. In order to implement the Council of Ministers resolution on the 10mm mesh size for use in mukene fishing and fishing 2 km offshore, catamaran technology for mukene fishing was promoted with construction of 3 demonstration catamaran boats and procurement of 10mm mesh size nets, engines, generators and other fishing gear.

Demonstration fishing trials were conducted with fishermen and communities at Kiyindi (Buikwe) and Kasekulo (Kalangala) trained in fishing operation and safety in lake waters. One frame survey was conducted on Lake Victoria and two catch assessment surveys were conducted on Lakes Kyoga and Edward/George to collect data for guiding fisheries management and development. This was done in collaboration with the National Fisheries Resources Research Institute (NaFIRRI). The DFR has maintained a database on the entire fisheries statistic with data on catch assessment survey, frame surveys, fish export data, licensing data, aquaculture development and quality control.

Control and management of aquatic weeds continued on all affected water bodies namely Lake Victoria, Kyoga, Albert and River Kagera with mechanical control, biological control and manual removal. Manual removal tools and protective wear (wheel barrows, pangs, life jackets, forked hoes and spades) were procured for community manual removal. With a daily harvest of approximately 600 tones of aquatic weeds, the progress infestation of River Kagera, which is vital for the ecological health of Lake Victoria, was reduced. Draft guidelines/rules for aquatic weed management in Uganda were prepared and the process to finalize and adopt them for implementation is ongoing.

Environment and Natural Resources sub-projects are being developed for implementation in areas of fisheries development and water hyacinth control. This is in line with a community demand driven approach focusing on Lake Victoria riparian districts.

The DFR has developed a draft Silver Fish (Mukene) Policy and Management Plan that is being enriched to include all the small fish species that have of recent emerged as a major fishery following the decline in Nile Perch and Nile Tilapia fishery

During the year, progress was made on provision of on-farm water for fisheries production with construction of 12 dams in Ssembabule, Mubende, Mityana, Kyankwanzi and Mbale districts. Communities in these areas were also trained in pond and weed management through barazas and provision of information communication materials like posters and brochures. Progress was also made on construction of landing sites with 17 fish landing sites at Kalangala (2), Bugiri (1), Mayuge (3) Busia (1), Kampala (1), Mukono (1), Masaka (1), Rakai (1), Buyende (1), Buliisa (1), Amolatar (1), Serere (1), and Nakasongola (1). Six of the landing sites on Lake Victoria were

completed while the rest were rated at 80% completion. Improvements have also been made other landing sites on Lakes Albert and Kyoga.

The Department promoted Lake wide Management Organizations (LMO's) for Lakes George, Kyoga and Victoria, namely; LAGBIMO, LAKIMO and LVFO in the management of shared fisheries resources. The process for formation of a LMO for lakes Albert and Edward is on going under LEAF project. Co-management was also promoted at 784 BMUs on Lakes George, Edward, Victoria and Albert and some minor lakes where communities were involved in fisheries management involving Monitoring Control and Surveillance. A review of the BMU guidelines and statute was conducted to update it for effective implementation and service delivery.

Regulation and Control

The DFR carried out registration of applicants for licensing through the application process, certification and vetting exercise for licensing. Updated lists for the vetted fishers ready to be licensed are available in the DFR database. In order to streamline the growing regional trade, guidelines for regional fish trade were developed through a stakeholder consultative process. The guidelines have been printed for dissemination. Implementation of the LVFO Council of Ministers of Lake Victoria region was undertaken to enforce the use of 10mm mesh size for Mukene and slot sizes for Nile perch and Nile Tilapia and the recommended fishing nets and hooks for Nile perch through Monitoring Control and Surveillance. In order to promote sustainable funding, parliament approved a Fisheries Management and Development Fund to be operational beginning F/Y 2011/12 under Fish (Amendment) Act, of 2011 and efforts to have a fish levy trust fund are also ongoing at regional level.

Quality Assurance

Seven artisans Community processing infrastructure (drying racks, dip frying and smoking kilns) were constructed for Mukene processing at Katebo (Mpigi) and Kikondo and Kiyindi (Buikwe) and Katosi (Mukono) and Kasekulo (Kalangala) landing sites on Lake Victoria Plate 2. Other infrastructure completed for community use included 20 urban and rural fish markets in various Districts. Fish handling structures were also constructed in Ntoroko and Kayei landing sites in Ntoroko and Apac districts respectively under QFMP.

Practical training was conducted for women fish processors at Kiyindi (Buikwe) and Kashekulo (Kalangala) on improved fish processing methods. The two women groups are now processing and packing Mukene for sale in super markets. Kyoga basin has undergone comprehensive training for fishers and processors in quality assurance and fish handling. Training of Trainers (TOT's) were conducted for inspectors on quality assurance techniques and other quality assurance related issues in the districts of Buyende, Nebbi, Hoima, Bullisa, Ntoroko, Soroti, Amolatar, Apac and Nakasongola. Capacity building was undertaken for 15 Local Fish Inspectors and 15 commercial fish farmers in central and western Uganda;

Value addition was promoted through the development of new (silver fish) mukene products namely sweet mukene, chips mukene, sim-sim mukene and powdered mukene (Plates 2 a-d). These products need to be popularized for the private sector to adopt and develop for marketing. Guidelines for sanitary handling of mukene animal feed were developed in order to improve on the handling and quality along the value chain. Technical and stakeholder meetings were held to

review Quality Assurance Rules and Standard Operating Procedures (SOP's). The reviewed SOPs have since been printed for dissemination.

Residue sampling for sediment, water and fish was carried out in aquaculture fish farms and Lake Victoria. Laboratory Analysis was done and records kept for reference. The Department hosted the EU Food and Veterinary Inspection Mission that kept Uganda on list one to export fish to EU. The Mission also granted approval for export of aquaculture products to the EU member states.

The Quality Assurance Unit conducted compliance inspection of 20 fish processing plants and establishments including gazetted landing sites on Lakes Victoria, Kyoga and Albert for compliance and ensuring fish quality and safety

Aquaculture

Aquaculture production rose from 285 metric tons in 1999 to 100,000 metric tons in 2010/11, with 2500 ponds existing throughout the country. Currently there are over 2000 emerging commercial farmers with over 5000 ponds. The cage culture is another activity that has emerged with over 750 cages by groups or individuals. Construction of demonstration aquaculture tanks was initiated as a way of promoting commercial aquaculture; over 100 tanks have been constructed. The Department has constructed four regional fish fry production (hatcheries) and demonstration centers in Mbale, Gulu, Kajjansi and Bushenyi under Fisheries Development Project. These facilities are expected to boost aquaculture development in Uganda with provision of quality fish seed to farmers. Five hundred emergent commercial fish farmers and subsistence fish farmers received direct support to boost their production. The Department issued permits to 100 farmers for small water bodies to engage in cage culture, one of the methods earmarked to increase fish production.

1. INTRODUCTION

Fisheries resources are among the most significant natural endowments of Uganda. With about 20% of its surface area covered by water, Uganda has enormous fisheries resources potential for both capture fisheries and aquaculture production. Uganda's fisheries landscape includes the five large lakes of Victoria, Kyoga, Albert, Edward, George and Kazinga Channel, 160 minor lakes, rivers (Albert Nile), swamps and floodplains all of which are critical habitats, breeding and nursery grounds for fish and suitable sites for fish farming. Uganda's fisheries resources are not only diverse in aquatic ecosystems but also in fish species biodiversity.

Pursuant to existing pertinent national strategies and frameworks like the Comprehensive Africa Agriculture Development Programme (CAADP) in which Uganda is committed to the principle of agriculture growth as a main strategy; the National Development Plan (NDP) which recognizes fisheries as one of the primary growth sub sectors and; the Agriculture Sector Development Strategy and Investment Plan (DSIP) which considers fish among the first 10 agriculture commodities to be promoted.

Cognizance of the aforesaid policy directions, the Department of Fisheries Resources which is mandated to promote, guide, support and regulate fisheries sub sector has significantly contributed to the economy in terms of employment creation, income, food security. Overall, fisheries sub sector is estimated to contribute 12% to the agricultural GDP and 2.5 % to the national GDP. Therefore, the importance of fisheries subsector in implementing MAAIF DSIP and therefore overall vision of the National Development Plan (NDP) cannot be overstated.

Over the last 10 years, the fisheries sub sector has taken a strong position in the country's economy as the second largest foreign income earner after coffee (MFPED, 2003) with the Nile Perch, Nile Tilapia and Mukene forming the mainstay of the fisheries. Fish emerged as a non-traditional export commodity in the late 1980's, with export earnings increasing from US$ 5.3 million in 1991 to US$ 83.3 million in 2010. The highest value from fish exports ever realized was in 2005 when 36,614 tons of factory processed fish were exported, generated US$ 143,168 and accounting for 18 percent of total exports. The main export market is the European Union and others include the Middle East, United States, Egypt and South-East Asia (UFPEA, 2003).

In addition to international exports, there is a dramatic increase in regional export markets to neighboring countries based mainly on Nile Tilapia, Nile Perch by products from processing factories and silver fish (Mukene).

Overall, exports to international markets have recently declined sharply, falling from a peak of 39,201 tons in 2005 to about 15,417 tons in 2010[1]. This is mainly attributed to declining catches, falling stocks, over-fishing and expanses of regional markets.

With the production of existing five major and 160 minor water bodies, the country is able to produce 460,000 metric tons out of which 210,000 metric tons* is for small fishes of small fishes including mainly Mukene, Muziri and Ragogi and aquaculture is estimated to contribute 150,000

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metric tons. By 2015 the fisheries sub fisheries sector is expected to produce up to 1,000,000 metric tons mostly through revamped aquaculture and making use of emerging fishery of small fishes like Mukene on Lake Victoria and Ragogi on Lake Albert.

The fisheries sub-sector further contributes to national economic welfare through; **Employment:** About 1,000,000 – 1,500,000 people are directly or indirectly employed in fisheries related activities, about 5,000 people are working with industrial processing fisheries sector, with fisheries overall contributing to the livelihood of nearly 5.3 million people. **Income:** Over 1.2 million people are directly dependent on the fisheries sub-fisheries sector as the main source of household income. **Food Security:** Fish forms an important part of the diets of people, fish being a major source of critically required animal protein diet for about 34.5 million Ugandans (5.7 kgs/ per capita consumption which is below the recommended WHO level of 12.5 per capita). The silver fish and other fishes are also important as the only known means of addressing the prevalent lack of micronutrients (hidden hunger) in the population.

1.1 Vision of DFR

The national vision for fisheries under the Department of Fisheries Resources (DFR) in Uganda is "to ensure sustainable and efficient exploitation, and culture of fishery resources, for posterity without degrading the environment"

1.2 Mandate of DFR

The DFR under Ministry of Agriculture Animal Industry and Fisheries, in the Directorate of Animal Resources is the technical Department mandated to promote, support, guide and regulate fisheries subsector in Uganda. Furthermore the Department retains the responsibility for setting and enforcing the standards and regulations for practices pertaining to fisheries and aquaculture.
In line with the Development Strategy and Investment Plan (DSIP 2010-2015), the Department ensures controlled access to sustainable utilization of the resource base and aquaculture development; while the development of the socio-economic potential of the fisheries sector lies mainly with the local governments, the communities and the private sector.

1.3 Functions of DFR

The functions of DFR include:

(i) Formulation and review of Policies, legislations, regulations and guidelines and strategies;
(ii) Formulation and review of the National Fisheries plans and strategies;
(iii) Formulation and monitoring of standards for fish handling for both fish from capture fisheries and fish farming;
(iv) Carryout Monitoring Control and Surveillance of fishing activities at national level;
(v) Supervision of all gazetted landing sites, fish processing establishment and all matters that are related to processing ;
(vi) Coordination with national enforcement agencies on the implementation of the Fish Act;
(vii) Promotion, support, guidance and regulation of the development of aquaculture;

(viii) Carryout periodic frame surveys and socioeconomic surveys at national level;
(ix) Collection of data on fish catch, aquaculture, fish exports, post harvest and maintenance a national data base on fisheries sector;
(x) Control of water hyacinth and other aquatic weed;
(xi) Monitoring and inspection of local governments (Districts) on fisheries related activities;
(xii) Provision of technical guidance and capacity building to the local governments;
(xiii) Coordination with neighboring states with regard to harmonizing fishing activities on shared water bodies.

In execution of her mandates, DFR strongly collaborates with: Government Ministries, Institutions, Agencies and Departments (MIADs), in addition, to the private sector and the Development Partners as key stakeholders in fisheries management and development.

1.4 Legal Policy and Institutional Framework

The Fish Act, Cap. 197 (2000) of the Laws of Uganda is the principle law that governs the Department of Fisheries In Uganda. It provides for the control of fishing, fish conservation, purchase, sale, marketing and processing of fish and matters connected therewith. It is supported by several subsidiary regulations that are issued from time to time. The policy framework for the sector is articulated in the Fisheries Policy, 2004. However, the implementation of MAAIF DSIP, overrides some of the policy statements contained in the Fisheries Policy 2004.

Currently the Department is headed by the Commissioner for Fisheries with two Divisions headed by Assistant Commissioners. DFR has mainly four core units namely, Water Bodies, Regulation and Control, Quality Assurance and Aquaculture. Please refer to the organo gram in Annex III. In this regard the performance of the sub sector for 2010/2011 presented herein is an output oriented report, which is benchmarked on key vote output functions. It is mapped against aforementioned DFR units and the current operational projects.

2. CAPTURE FISHERIES

2.1 Fisheries Resources Base in Uganda

About 20% of Uganda surface area is under water. This comprises of open waters occupying 36,909 Sq km, Swamps = 7,296 Sq km, Rivers =2000 Sq km, Minor Lakes=1000 Sq km. The Water Bodies Unit is responsible for initiating the process of developing Lake Management Plans (LMP) aimed at improving management and hence curbing the declining fishery resources on our water bodies. The Unit conducts demonstrations on fishing trials with fishermen and communities, trains in fishing operations and safety on water bodies. The unit conducts Frame Surveys on all water bodies in Uganda to collect data for guiding fisheries management and development; this is usually done in collaboration with the National Fisheries Resources Research Institute (NaFIRRI). The DFR has maintained a database on all fisheries statistics with data on catch assessment survey, frame surveys, fish export data, licensing data, aquaculture development and quality control. The development of key guidelines and policies that guide water bodies' management are generated from this Unit. Environment and Natural Resources sub-projects are being developed for implementation in areas of fisheries development and water hyacinth control. This is following a community demand driven approach with Lake Victoria riparian districts. Over the years, the water bodies of Uganda have experienced a decline in production levels as shown in figure 1 below.

Figure 1: Production of Water Bodies in Uganda

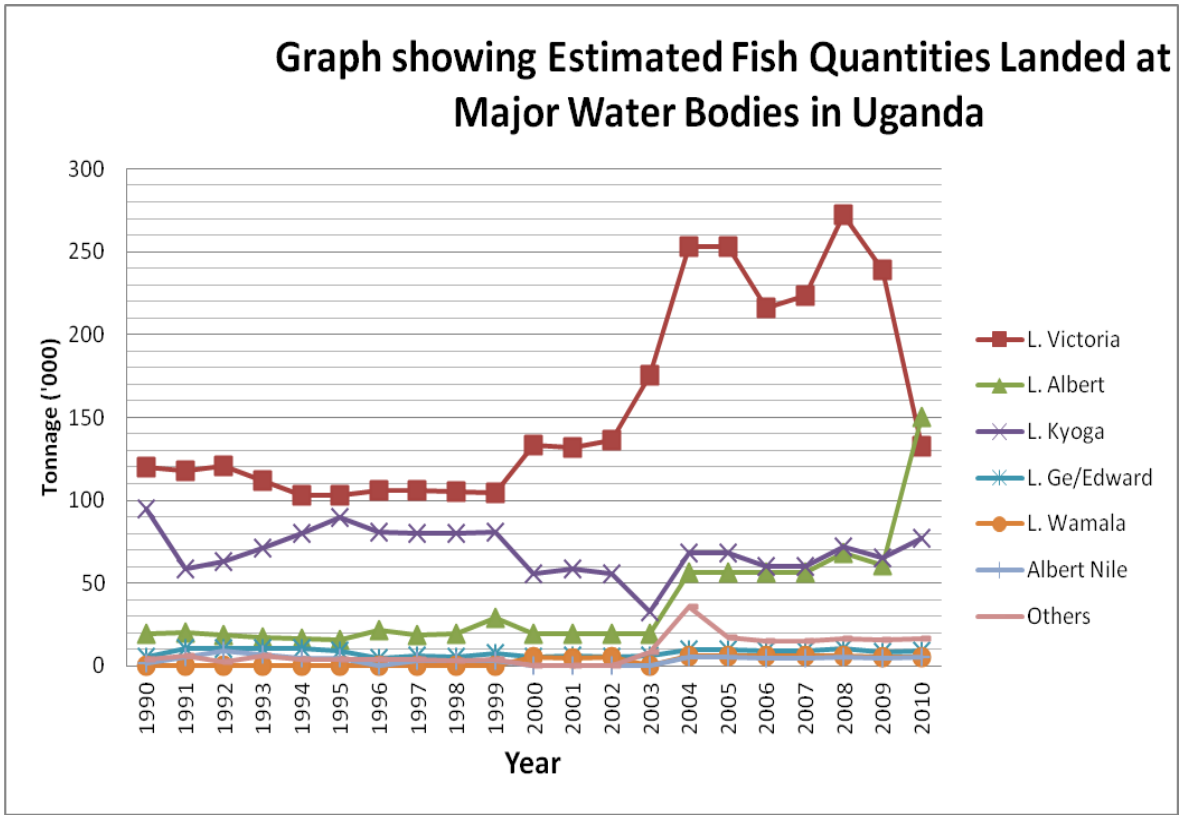


Table 2.1: Showing Catches from Small Water Bodies (2010)

Lake/Water Body	Area in Sq Km	Current Production (MT) 2010	Total Potential
Buhwenju Lakes	3	64	111
Bunyaruguru Lakes	21	513	889
Kisoro/Kabale	34	633	1,096
Pallisa/Bugiri Lakes	125	125	217
Nyamusingiri	4	60	104
Kachera	38	1,104	1,912
Kijanebalola	38	849	1,470
TOTAL		**416,757**	**721,823**

Source: DFR Field Reports 2010

2.2 The Water Bodies Unit

The Water Bodies Unit which plays a key role in ensuring sustained management plans of all water bodies in Uganda.

Planned Activities in 2010/2011

For the reporting period planned the following activities;

(i) Conduct an assessment of water bodies for stocking;
(ii) Identify fish breeding areas for marking, gazzetting and protection on Lake Victoria;
(iii) Construct community water dams for fish production in Mityana;
(iv) Develop Masese landing site in Jinja and Buvumbo in Mpigi;
(v) Construct one demonstration catamaran boats for effective Mukene fishing;
(vi) Conduct mechanical weed control operations on River Kagera in Rakai;
(vii) Conduct 4 mukene fishing demonstrations using the new catamaran technology;
(viii) Conduct one Catch Assessment survey on Lake Victoria in collaboration with NaFIRRI;
(ix) Develop HIV/AID preventive strategy in collaboration with FAO;
(x) Revise the BMU guidelines and a BMU statutory instrument drafted;
(xi) Develop a draft small fishes policy, strategy and management plan;
(xii) Develop guidelines for good practices in manufacture of animal feed.

Achievements in 2010/2011

In terms of achievements, the Water Bodies Unit accomplished the following:

(i) The Water Bodies Unit initiated the process of developing Lake Management Plans (LMP) aimed at improving management measures and hence curbing the declining fishery resources on our water bodies. In order to implement the Council of Ministers resolution on the 10mm mesh size for use in Mukene fishing and fishing 2km offshore, catamaran technology for mukene fishing was promoted with construction of 3 demonstration catamaran boats and procurement of 10mm mesh size nets, engines, generators and other fishing gear.
(ii) Demonstration fishing trials were conducted and fishermen and communities at Kiyindi (Buikwe) and Kasekulo (Kalangala) trained in fishing operation and safety at sea.
(iii) The Unit promoted lake wide management organizations (LMO's) for Lakes George, Kyoga and Victoria, namely; LAGBIMO, LAKIMO and LVFO in the management of

shared fisheries resources. The process for formation of a LMO for lakes Albert and Edward is on going under LEAF project. Co-management was also promoted at 784 BMUs on Lakes George, Edward, Victoria and Albert and some minor lakes where communities were involved in fisheries management involving MCS.

(iv) A review of the BMU guidelines and statute was conducted to update it for effective implementation and service delivery

(v) One Frame Survey was conducted on Lake Victoria and two catch assessment surveys were conducted on lakes Kyoga and Edward/George to collect data for guiding fisheries management and development. This was done in collaboration with the National Fisheries Resources Research Institute (NaFIRRI). The DFR has maintained a database on these entire fisheries statistics with data on catch assessment survey, Frame surveys, fish export data, licensing data, aquaculture development and quality assurance.

(vi) Control and management of aquatic weeds continued on all affected water bodies namely Lake Victoria, Kyoga, Albert and River Kagera with mechanical control, biological control and manual undertaken. Manual removal tools and protective wear (wheel barrows, pangs, life jackets, forked hoes and spades) were procured for community manual removal. Reduced weed infestation on River Kagera through daily harvesting of about 600 tones removed daily. This reduces the weed entering Lake Victoria hence saving the deterioration of the ecological health of this important lake.

(vii) Draft guidelines/rules for aquatic weed management in Uganda were prepared and the process to finalize and adopt them for implementation is ongoing.

(viii) Environment and Natural Resources sub-projects are being developed for implementation in areas of fisheries development and water hyacinth control. This is following a community demand driven approach with Lake Victoria lake riparian districts.

2.3 Fisheries Co-Management

Fisheries Co-management is a management approach where the responsibility of managing fisheries resources is shared between the government, fishing communities and other key relevant stakeholders. Fisheries co-management was adopted in Uganda to ensure sustainable fisheries management.

Activities and Achievements in 2010/2011

During the period under review planned Fisheries co-management activities were largely not implemented because of inadequate funds under recurrent expenditure. However the following achievements were made;

(i) Fishing communities in Mukono, Wakiso and Kampala were sensitized on dangers and legal implications of the practice;

(ii) With support from ACP Fish II Project three Senior Fisheries Officers attended a Regional Training on Co-Management organized for Burundi, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda in Jinja;

(iii) Election of new BMU committees were followed up by correspondences with district Chief Administrative Officer and District Fisheries Officers;

(iv) Petitions over BMU elections from Kasese, Mayuge and Namayengo districts were followed up and conflicts thereof arbitrated;
(v) The Fish (Beach Management) Rules, 2003 were revised draft in place;
(vi) With support from Fish Quality Assurance and Marketing Project (FQAMP) newly elected BMU committees in Hoima, Buyende and Bullisa districts were orientated/ trained on BMU operations and co-management.

In addition to the above, the Department promoted Lake wide Management Organizations (LMOs) for Lakes George, Kyoga and Victoria, namely; LAGBIMO, LAKIMO and LVFO in the management of shared fisheries resources. The process for formation of a LMO for lakes Albert and Edward is on going under LEAF project. Co-management was also promoted at 784 BMUs on Lakes George, Edward, Victoria and Albert and some minor lakes where communities were involved in fisheries management involving MCS. A review of the BMU guidelines and statute was conducted to update it for effective implementation and service delivery.

2.4 Fishing Communities and HIV/AIDS

Under Multi-Sectoral AIDS Control Approach (MACA), Ministry of Agriculture Animal Industry and Fisheries is implementing HIV and AIDS prevention and impact mitigation interventions. At the Ministry an HIV & AIDS Coordination Unit was established and the Department of Fisheries Resources is represented by a Fisheries HIV and AIDS Focal person.

Activities and Achievements in 2010/2011

During the period under review, the key achievements under HIV and AIDS to which DFR contributed include:

(i) Development of an Agriculture Sector HIV Response Strategy with financial and technical support from FAO;
(ii) Supervision of a Sero – Behavioral Survey conducted among the fishing communities on Lake Victoria to establish the prevalence rates and attendant behaviors. This was supported by East Africa Community, AMREF and Lake Victoria Partnership (EALP) Programme;
(iii) A project to cover Lake Edward and George basin has received funding under UK-AID a development partner with activities focusing on creating awareness about the disease and its impacts on the fishing communities.

2.5 Fisheries and Oil

Uganda has discovered oil and gas in commercially viable quantities in the Albertine Graben which is the most prospective oil region so far. The Albertine Graben stretches from Ubongi, on the Uganda – Sudan border to Ishasha on the South Western tip in which Albert Nile, Lake Albert, and Lakes Edward and George lie. Other oil potential areas in Uganda are Lake Kyoga basin, Hoima basin, Lake Wamala basin and Kadam-Moroto basin

In the Albertine Graben there is an overlap of natural resources namely Oil and Gas, Fisheries, Wildlife, Water, Forests, and Agricultural resources. This pattern, however, presents both economic opportunities and environmental challenges due to negative impacts associated with

development of oil and gas sector. Unregulated oil and gas industry development activities are bound to be a challenge to fisheries sub-sector in a number of ways including;

(i) Lake water pollution thereby disrupting aquatic ecological processes, reduction in fish species biodiversity, decline in fish production, loss of livelihoods by fishing dependent communities, and loss of national economic benefits accruing from Albertine Graben lake fisheries resources.
(ii) Institutional and human capacity gaps in the fisheries sub-sector to continuously monitor oil exploration and development activities and design sustainable fisheries resources management approaches that are in tandem with oil and gas development.

To address national challenges of oil and gas industry development, a Programme Agreement "*Strengthening the Management of the Oil and Gas Sector in Uganda"* was entered into between the Norwegian Ministry of Foreign Affairs and the Government of the Republic of Uganda in July 2009 regarding development cooperation for strengthening the management of the Oil and Gas Sector in Uganda. The overall objective of the Programme is to contribute to the achievement of the goal of the National Oil and Gas Policy of Uganda which is: "To use the country's oil and gas resources to contribute to early achievement of poverty eradication and create lasting value to society".

The purpose of the program is: "to put in place institutional arrangements and capacities to ensure well-coordinated and results oriented Resource management, Revenue management, Environmental management and HSE management in the oil and gas sector in Uganda" in order to contribute to the achievement of the objectives of the National Oil and Gas Policy (NOGP).

The programme is implemented under the three Pillars of; Resource Management, Revenue Management and Environment Management. The Environment Management Pillar is constituted by National Environment Management Authority (NEMA), Directorate of Water Resources Management (DWRM), Uganda Wildlife Authority (UWA), National Forestry Authority (NFA) and Department of Fisheries Resources (DFR), Directorate of Environment Affairs (DEA).

Activities and Achievements

During the period under review; the activities that were undertaken in the Environment Management Pillar and to which the Department of Fisheries Resources contributed included;

(i) Formation of a Steering Committee to guide the Strategic Environmental Assessment for the Albertine Graben;
(ii) Finalization of the second phase of Sensitivity Atlas for Albertine Graben;
(iii) Study tour to Norway by National Monitoring Executive Committee (composed of Heads of Institutions of Environment Pillar) to share experience on management of the waste generated from Oil and Gas waste and compliance with monitoring;
(iv) Capacity Building Study tour to Norway by National Technical Environmental Pillar members and District Environment officers of Hoima, Nwoya and Bullisa was conducted, to look at how Norway has managed the waste generated from Oil and Gas activities and its compliance with the monitoring program.
(v) Capacity Needs Assessment for the oil and gas sector for the institutions in the Environment Pillar was conducted;

(vi) TORs for a study on environmental regulations and standards relevant to the oil and gas sector were developed, revised and have been distributed to institutions in both Uganda and Norway for comments. The TOR have been finalized and a consultant was expected to be procured by February 2011;

(vii) A stakeholder workshop to review the concept paper and TORs for a study of management system for hazardous waste on the oil and gas sector was held in November 2010 and the procurement of a consultant to undertake this study is expected to be completed in January 2011;

(viii) Stakeholder workshop on development of indicators for environmental monitoring system for the Albertine Graben was held in November 2010; the workshop was successfully carried out and the outcomes are preparation of a background paper by the editorial committee that was selected by the meeting and this was held in February 2011. A Scoping meeting for development of indicators was held in April 2011, followed by a meeting for the steering committee to finalize the indicator document. In addition there was a meeting to prepare and standardize the maps and other data on sensitivity in preparation for the third edition of the Sensitivity Atlas;

(ix) The development of the web database is underway. The second edition of the Environmental Sensitivity Atlas has been produced and nine districts have already received copies for use in their work;

(x) A meeting was held on 22nd November 2010 to review progress on Strategic Environment Assessment for the Albertine Graben. It was recommended that a retreat be held to formulate TORs for a consultant to undertake the SEA and TOR for the steering committee;

(xi) An annual planning meeting for the environmental pillar was held on 23rd November 2010 to review progress of 2010 and generate a work plan and budget for 2011;

(xii) Multi-sectoral environmental inspection of oil activities in the oil fields around Lake Albert (8th to 13th November 2010).

3. AQUACULTURE DEVELOPMENT

3.1 Aquaculture Unit

Aquaculture Unit spear heads fish farming activities in Uganda in collaboration with the NAFFIRI Kajjansi and donor support agencies. The potential for aquaculture production in Uganda is quite enormous. However, a new policy is required to harness this potential. Largely aquaculture is practiced based on small scattered unproductive pond based systems that cannot attract a good service and input supply support system.

Planned Activities

In the reporting period the following were planned activities to improve aquaculture production

(i) License all aquaculture establishments in the country;
(ii) Conduct inspection services for all establishments in the country;
(iii) Train fish farmers in improved fish farming techniques;
(iv) Support live fish marketing groups in Kampala;
(v) Conduct exhibitions at Agriculture shows;
(vi) Finalize the Aquaculture Strategy and Plan;
(vii) Develop manuals and brochures on appropriate fish farming practices.

Achievements

For the reporting period, aquaculture received support from various entities in line with the DSIP and the following are the achievements;

(i) Licensed 20 Fish Farms;
(ii) Inspection services conducted to over 30 fish farming establishments;
(iii) 250 Fish farmers trained in Kiboga;
(iv) Supported one live fish marketing group in Kampala;
(v) Conducted an exhibition at Agriculture Show in Jinja and on World Food day in Arua;
(vi) Developed manuals and brochures on fish farming practices;
(vii) The Department is rehabilitating four regional fish fry production (hatcheries) and demonstration centers in Mbale, Gulu, Kajjansi and Bushenyi under FDP with over 80% of the works complete. These facilities are expected to boost aquaculture development in Uganda with provision of quality fish seed to farmers;
(viii) Five hundred emergent commercial fish farmers and subsistence fish farmers received direct support to boost their production under Fisheries Development Project;
(ix) The Department issued 100 aquaculture establishment permits to engage in aquaculture production to increase fish production;
(x) The Department is in the process of finalizing the Aquaculture Policy to support the development of the industry. In addition, 5 workshops were conducted on Development of Aquaculture Strategy and Plan;
(xi) The Final draft of Aquaculture Strategy and Plan has been developed.

3.2 Aquaculture Production Systems

Aquaculture in fisheries sub sector has picked up in the last 5 years and the business and research community is engaged in aquaculture through use of various production systems that range between earthened ponds, cages, reservoirs and tanks.

Ponds: Earthly ponds are estimated at 25,000 Fish ponds covering 10,000 hectares and producing 100,000 tonnes annually. Fish greatly contributes to all fisheries sectors of the economy ranging from feeding farm animals, households and hotels to tourism etc .Organized pond production systems such as Aquaculture parks well serviced should be encouraged for increased fish production.

Figure 3.2: Fish cage made of local materials on Lake Albert

Cages:

It involves fish growth in a closed net structure fixed into an entirely large water body. The water bodies are lakes, water reservoirs, rivers, dams and valley tanks and production is localized in areas with these water resources. Production is spearheaded by the private fisheries sector and there is high enthusiasm for it and production is expected to rise as farmers are seriously picking up on cage farming initiative due to the following factors and therefore should be promoted:

(i) Availability of water resources and materials for construction;
(ii) No direct or direct need for induced water reticulation and quality control;
(iii) Readily available pelleted fish feed.

Tanks:

Involves fish production in completely intensive power or gravity driven systems and their requirement for technical design, materials and energy has rendered them a bit expensive thought. There are very few farmers using tanks but mainly at their backyards. There is laxity by farmers to engage in completely intensive rearing due to expensive materials, and high technology end technique required in fish farming.

Hatcheries:

There are over 50 hatchery operators in the country with good hatchery establishments with capacity to produce quality fish seeds for supply and distribution.

Other Systems:

The government restocking program had shown potential of increased production from dam's ponds minor lakes and valley tanks. Other systems may include raceways and other water holding facilities like pens, irrigation streams and a collection of the above systems but are not taking root yet in Uganda due to lack of awareness and high capital investment.

4. REGULATORY AND CONTROL SERVICES

DFR retains the lead role on all regulatory issues in the fisheries sub-sector in MAAIF, with the regulation and control unit taking the lead. This unit is responsible for Monitoring Control and Surveillance (MCS) of fisheries activities. Overall, the unit regulates fishing activities. It controls fishing capacity and enforces measures to curb illegal fisheries and malpractices. The unit also regulates fish trade at all levels and collaborates with other agencies, co-management structures, the fisher fork and Local Governments.

Planned activities to ensure a well regulated fisheries sub-sector for the reporting period include;

(i) Conduct of Sensitization meetings
(ii) Undertaking enforcement on all water bodies of Uganda.
(iii) Licensing to regulate the fishing activities
(iv) Developing the project for Enforcement
(v) Developing guidelines on Regional Fish Trade
(vi) Developing Standard Operating Procedures for enforcement
(vii) Developing Standard Operating Procedures for authorized Officer

4.1 Licensing

(i) In order to streamline the growing regional trade, guidelines for regional fish trade were developed through a stakeholder consultative process. The guidelines have been printed for dissemination.
(ii) Implementation of the LVFO Council of Ministers of Lake Victoria region was undertaken to enforce the use of 10mm mesh size for mukene and slot sizes for Nile perch and Nile Tilapia.
(iii) Monitoring Control and Surveillance ensured the use of the recommended fishing nets and hooks for Nile perch
(iv) Parliament approved a Fisheries Management and Development Fund to be operational beginning F/Y 2011/12 under Fish (Amendment) Act, of 2011 and the statutory instrument to operationalise this fund has been developed by MoFPED. In the same way, efforts to have a fish levy trust fund are ongoing at regional level.
(v) DFR recalled the licensing exercise from the districts back to the centre. Regulation unit coordinated this activity with Local Governments in vetting application forms and subsequent issue of licenses. The application fee is 10,000 shillings while the license fee varies according to the activity applied for.
(vi) The applications were received by the District Fisheries Officers (DFO) and vetting was done by staff from the Department of Fisheries Resources (DFR) assisted by the DFO. The vetting exercise was completed in March 2010 and the applicants for each category are shown in the table 4.1 and 4.2 below.

Table 4.1: Number of Fishers who applied for Licenses in various categories and Expected Revenue

LAKE	Fishing Vessel License	Fishing Permit /Photo sanitary Certificates	Artisanal Processing	Fishmonger	Fish Transporter	Boat Builder	Gear Repairer
Victoria	13,450	32,600	867	553	245	50	35
Kyoga	4,160	8,012	456	455	127	40	40
Albert	3,709	7,009	250	348	170	24	20
George	266	532	144	87	80	16	19
Edward	288	576	110	92	95	22	13
Others	520	623	150	55	55	17	18
Factories	0	768	0	40	120	0	0
Regional Traders					150		
TOTAL	**22,393**	**50,120**	**1,977**	**1,780**	**892**	**169**	**145**

Table 4.2: Expected Revenue from Licensing

COSTING	Fishing Vessel License	Fishing Permit /Photo sanitary Certificates	Artisanal Processing	Fishmonger	Fish Transporter	Boat Builder	Gear Repairer	Total
								'000 million Ug shs.
Victoria	1,345.00	815.00	43.35	27.65	122.50	2.50	1.75	**2,357.75**
Kyoga	416.00	200.30	22.80	22.75	63.50	2.00	2.00	**729.35**
Albert	370.90	175.23	12.50	17.40	85.00	1.20	1.00	**663.23**
George	26.60	13.30	7.20	4.35	40.00	0.80	0.95	**93.20**
Edward	28.80	14.40	5.50	4.60	47.50	1.10	0.65	**102.55**
Others	52.00	15.58	7.50	2.75	27.50	0.85	0.90	**107.08**
Factories		15.36		2.00	6.00			**23.36**
TOTAL	**2,239.30**	**1,249.16**	**98.85**	**81.50**	**392.00**	**8.45**	**7.25**	**4,076.51**

4.2 Enforcement

A National Fisheries Taskforce (NFT) was formed constituting Officers from Department of Fisheries Resources, Uganda Fish Processors and Exporters Association (UFPEA), Uganda Police, Uganda Revenue Authority, Beach Management Unit representative. The main objectives of the NFT are;

(i) Enforce relevant laws and control illegal importing and criminal use of illegal fishing gears, trading in immature fish, trading without proper documentation, smuggling and practicing Illegal Unregulated Unrecorded (IUU) fishing;

(ii) To promote enforcement through joint and synergistic action with relevant Departments;

(iii) To regulate transactions and trafficking in contraband fish and fisheries related products.

Within enforcement the following was achieved:

(i) Nine meetings were held with the NFT task force members

(ii) A standard operational manual on monitoring control and surveillance was developed

(iii) A concept paper on support to enforcement was developed and presented it to the Permanent Secretary

(iv) Developed Guidelines on importation and marketing of fishing gears

(v) Fish poisoning activities in Mityana and Mayuge were monitored through districts in which samples were collected samples and submitted to Chemiphar.

(vi) Developed a database on fisheries illegalities

Figures: Illegal Gears and Immature fish impounded during enforcement in the year 2010/2011 on Lake Victoria

Table 4.3: Enforcement Achievements (DFR, Local Governments, Communities) 2010/2011

a) DFR

Type of Infringement	Est. Quantity‘	Estimated Value Shs. ‘000
Immature fish impounded	200,000 Kgs	300,000,
Beach Seines	1200 units	17,400
Monofilament nets	2400 units	28,800,
Undersize gill nets	3800 units	19,000,
Boat seines	800 units	40,000,
Cast nets	1000 units	14,000,

b) Districts

Type of Infringement	Est. Quantity‘	Estimated Value Shs. ‘000
Immature fish impounded	9,000 Kgs	25,000,
Beach Seines	800 units	14,000
Monofilament nets	990 units	28,800
Undersize gill nets	2100 units	11,000,
Boat seines	380 units	19,000,
Cast nets	900 units	10,000,

c) Co- management groups (AFALU, and BMU's)

Type of Infringement	**Est. Quantity'**	**Estimated Value Shs. '000**
Immature fish impounded	-	-
Beach Seines	300 units	-
Monofilament nets	800 units	-
Undersize gill nets	1200 units	-
Boat seines	480 units	-
Cast nets	600 units	-

Source; DFR Field Report 2010 (NB: some gears are too old to attach a value on them)

5. FISH TRADE AND MARKETING

5.1 International Fish Trade

It is important to note that over the last ten years, DFR has developed and sustained an integrated quality assurance system that has been verified by the European Union Inspection missions (FVO) and found it compliant with the at least equivalent conditions of the EU. Between 1997 and 2000, a ban was slammed on fish exports originating from Uganda to EU because of issues related to fish quality and safety. The effect of this ban was a gross negative impact on the economy in terms of declining foreign exchange inflows, unemployment and overall poverty.

However, safe guard measures and guarantees were instituted; subject to verification by EU Food and Veterinary Office (EUFVO) Inspection mission, which led to the lifting of this ban in 2001. The EU import rules for food feed seek to guarantee all imports as meeting the equivalent standards as products from the EU Member States - with respect to hygiene and consumer safety and, where applicable to the animal health status. To ensure that imports can take place smoothly and efficiently, the EU has designated public authorities with the necessary legal powers and resources as competent authorities to ensure credible inspection and controls throughout the value chain. In Uganda therefore the designated authority for fishery and Aquaculture products is the Department of Fisheries Resources (DFR).

Early 2009, DFR submitted the national residue control plan to EU for consideration of exports of aquaculture products. This submission was approved under EC Commission Decision 2004/432/EC of 11th June, 2010. Therefore Uganda *is among the list of third countries allowed to export fish and fishery products from both capture (2001) and culture fisheries (2010) to the European Union.* The main export market is the European Union and others include Australia, the Middle East, United States, Egypt and South-East Asia (UFPEA, 2003). Nile Perch (*lates niloticus*) products represent over 90 percent of exports, where consumers demand it for the presence of key omega-3-fatty acids, which have a beneficial effect on cholesterol levels, and for the palatable bone-free white flesh. However, undersized Nile Perch, Mukene, and Nile tilapia are the main products for domestic and regional markets.

Table 5.1: Total fish production and exports to EU 2009 to 2010

Common name	Scientific name	2009 Quantity ,000 MT	2010, Quantity ,000 MT	2009 Exports to EU	2010 exports to EU
Nile perch	*Lates niloticus*	146.0	152.6	14,080.44	12,375.56
Nile Tilapia	*Oreochromis niloticus*	36.6	38.1	Nil	Nil
Cyprinids	*Rastrineobola argentea*	183.3	190.4	Nil	Nil
Others		0.7	0.8	Nil	Nil
TOTAL		366.6	381.9		

There are twenty approved and certified fish processing factories, out of which eighteen process for export chilled and frozen products while two process for export of cured fishery products (smoked, salted and sun dried). There are also five registered small scale processing units that handle fish by products mostly dried fish maws which are destined mainly to Asian countries and Middle East. There are also two cold stores at the airport offering cold chain facilities just before freight or shipment. However, owing to declining fish stocks, financial constraints and other factors beyond the jurisdiction of DFR, out of twenty certified fish processing factories, three

processing plants completely closed down while the remaining operate at 30% of installed capacities.

Table 5.2: Fish Exports (Volume and Values) as a proportion of Total Exports

Year	Fish Exports Vol (tons)	Fish Exports Val.(US$'000)	All Exports Val.(US$'000)	Fish Exports Share
1991	4,751	5,309	n/a	n/a
1992	4,831	6,451	n/a	n/a
1993	6,037	8,807	n/a	n/a
1994	6,563	14,769	n/a	n/a
1995	12,971	25,903	574,266	5%
1996	16,396	39,781	710,655	6%
1997	9,839	28,800	594,628	5%
1998	13,805	34,921	536,749	7%
1999	13,380	36,608	478,750	8%
2000	15,876	34,363	401,645	9%
2001	28,672	80,398	451,765	18%
2002	25,169	87,574	467,605	19%
2003	25,111	86,343	534,106	16%
2004	30,057	102,917	665,089	15%
2005	36,614	143,618	812,857	18%
2006	32,855	136,851	962,193	14%
2007	28,394	117,364	n/a	n/a
2008	23,430	115,306	n/a	n/a
2009	17,346.70	85,436.30		
2010	23,967	119,600		

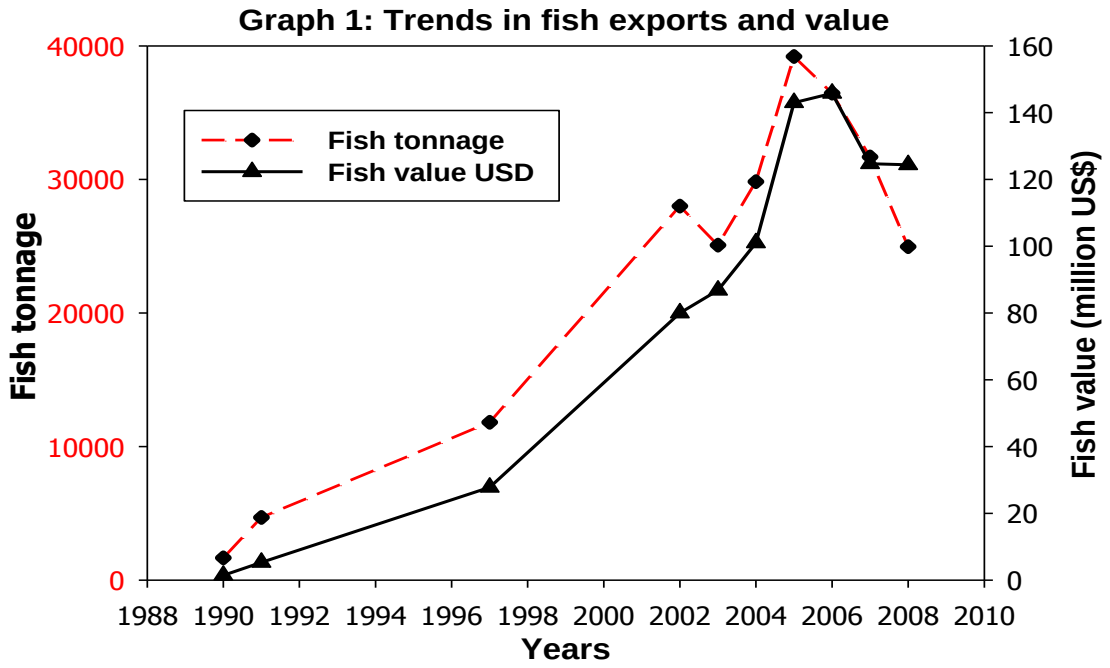
Source: DFR (2011) and MoFPED (2007)

5.2 Regional Fish Trade

The recent growth of regional fish trade is largely fuelled by cropping, processing and dealing in legally undersized Nile Perch and Nile Tilapia which has left 5 out of 20 fish processing factories out of business and 15 operating at less than 40% of their installed licensed processing capacities. It also estimated that nearly 60% of fish traded on the local market is immature and handled in largely unhygienic manner without the required legal formal clearance of the Department of Fisheries Resources.

Most of the regional trade is believed to be IUU or "informal". In 2007, Uganda Bureau of Statistics (UBOS) estimated regional fish trade at US$ 61.54 million while in 2008 it was estimated at US $ 69,603,975 Whilst officials and stakeholders fully recognize the importance and potential of fish trade both to food security to the population in the Region and also as one of the pillars for long-term economic growth, there is a need to ensure that the damage caused by supplying undersized fish to regional (and international) markets is minimized.

Fig 5.3: showing Graphical changes in fish exports in Uganda since 1991 to 2010



Source: *MAAIF, UFPEA & UBOS: 2009 Statistical Abstract and MAAIF DSIP: 2010*

Table 5.3: Uganda's informal exports of fish 2008 by destination

Destination	Quantity (MT)	Value '000 US $	% of Volume	% of value
DRC	12,466.33	36271.895	53.43	52.11
Kenya	5381.481	10102.791	23.06	14.51
Rwanda	71.049	225.759	0.30	0.32
Sudan	5404.879	22978.284	23.16	33.01
Tanzania	8.368	25.246	0.04	0.04
TOTAL	**23,332.11**	**69603.975**	**100.00**	**100.00**

Source: 2008 Report on informal trade by UBOS

Achievements

The Department has issued and gazetted Regional Fish Guidelines. The guidelines are in line with the MAAIF DSIP and further respond to the National Development Plan (NDP) for stimulating increased production and productivity, improved and sustainable exploitation and management of natural resources, processing and value addition, and market development. The Department has embarked on the process of developing a Statutory Instrument to regulate and control regional fish trade.

5.3 Local Fish Trade

The local fish trade in Uganda is thriving and a booming industry that is nearly all markets in Uganda selling fish usually by fish mongers carrying from various landing sites to these Markets throughout Uganda. The retail price of fish per Kg has been increasing for the last couple of years with bagrus (Semutundu) going at shs 15,000/=. Ngege (tilapia) at Shs.

10,000/=, Nile perch (Mpuuta) at Shs. 9000, cat fish (Male) at Shs. 5000/= and Mukene at shs. 2,800/= as at June 2011 as given in table below.

Table 5.4: Estimated average retail price value of fish for the estimates to 2011

Fish Species	**Retail Value per Kg in Shs.**		
	2009	**2010**	**2011**
Nile Perch	5,000	7,000	9,000
Tilapia	4,000	6,000	10,000
Cat fish	3,000	4,000	5,000
Bagrus	5,000	10,000	15,000
Mukene	1,500	2,000	2,800

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6. QUALITY ASSURANCE SERVICES

6.1 Background

Quality Assurance Unit is responsible for statutory inspections, certifications monitoring and control of fish and fishery products in fish processing establishments and upstream operations. It is under this unit that Uganda Fisheries Laboratory is established. This is mainly charged with the responsibility of analyses of samples to back up certification of and fishery products. Overall quality assurance unit conducts official controls which are the basis to guarantee safety and quality of fishery and aquaculture products destined for human consumption and eventual market access to local, regional and international markets.

Achievements

(i) Technical and stakeholder meetings were held to review Quality Assurance Rules and Standard Operating Procedures SOP's. The reviewed SOPs have since been printed for dissemination;

(ii) Sampling for monitoring of residues and environmental contaminants in sediment, water and fish was carried out in aquaculture fish farms and Lake Victoria. Laboratory Analysis was done and records kept for reference;

(iii) DFR was subjected to EU FVO Inspection mission in May 2011.The objective of the mission was to assess whether the organization of the Comptent Authority (CA) and the implementation of national provisions, against which the Uganda CA controls fishery products intended for export to the EU, can be considered as in line to the Community requirements. The Quality assurance unit adequately prepared and demonstrated that the official controls in Uganda met the equivalency of EU food and feed Law thus guaranteed safety and quality of fishery products exported from Uganda to EU member states. Overall, the EU FVO Mission report reaffirmed the approval status of Uganda on list one of third countries exporting fish to EU member states hence continued foreign exchange inflows from fish exports;

(iv) Quality Assurance Unit conducted compliance inspection of 20 fish processing plants and establishments including 32 gazetted landing sites on Lakes Victoria, Kyoga, Albert for compliance and ensuring fish quality and safety;

(v) The unit also ensured continued certification fish and fishery products for exports.

Activities

Activities carried out during the period under review included, but not necessarily limited to, the following:

(i) Supervision of 20 fish processing establishments and 32 fish handling facilities on matters relating to fish quality and safety for local, regional and international markets and adherence to proper hygienic protocols;

(ii) Guiding the industry on the implementation of strict quality and hygiene code of practice in artisanal fish processing and regional fish trade;

(iii) Preparation of extension materials for fish quality assurance, coordination and liaising with private fisheries sector and donors on the development of 10 fish landing sites that handle fish for local, regional and international markets;

(iv) Undertook the collection and synthesis of fish export data 2000 to 2010;

(v) Sampling of fish, water and sediments in the waters of Uganda to determine the levels of heavy metals and residues in them, whether they are within the permissible limits;
(vi) Monitored the modes of acquisition, transportation, processing and storage of fish and fisheries products especially those destined for European markets;
(vii) Certification of fish processing plants, issuance of fish health/sanitary certificates for every consignment of fish being exported out of Uganda;
(viii) Inspection of fish landing sites for adherence to sanitary and hygienic conditions;
(ix) Provided technical guidance to fish processors on modern fish processing technologies.

6.2 Uganda Fisheries Laboratory Services (UFL)

UFL is highly specialized in testing of fish and fishery products, water and ice, and have the ability to test other food products within its current scope of test parameters. The Laboratory consists of a microbiology section, sensory analysis section and the chemistry section. The microbiology and sensory analysis sections are complete and were funded by the Lake Victoria Environmental Management Project (LVEMP) and Icelandic International Development Agency (ICEIDA) in terms of infrastructure and operationalisation. The extension for laboratory covering the chemistry section was recently completed and furniture installed, although there are currently no equipment. Some equipment including Gas Chromatography Mass Spectrophotometer (GCMS) for pesticide residue analysis, Atomic Absorption Spectrophotometer (AAS); for heavy metal analysis and fume cabinets have been ordered. This section has been funded by the African Development Bank.

UFL carries out sampling of fish, tap water, lake water, ice and swabs from fish establishments, landing sites, lakes and fish ponds to implement its quality management system as well as monitor quality of fish and fishery products. A database has been put in place upon which the laboratory's external and internal assessments have been based. During the year under review, the lab collected and analyzed a total of 150 samples to determine the level of microbial contamination. Proficiency tests were also conducted for microbiological analyses in April and October 2010. Current test parameters are microbiological including; *Total Plate Count, Salmonella, Total Coliforms, Escherichia coli, Sulphite reducing clostridia, Staphylococcus aureus* and *Listeria monocytogens. Vibrio cholerae, moulds* and yeasts are soon to be considered as routine test parameters.

Achievements
(i) A set of assorted microbiological media and chemical reagents used during analysis of samples has been procured, 3 refrigerators for storing reagents were also procured.
(ii) A generator has been procured and installed to counter power fluctuations within the Laboratory and other Departmental offices.
(iii) Furniture including office desks, chairs, filing cabinets, chemical storage cabinet, stools and work benches have been procured and installed in the Chemistry section of the Laboratory.

In addition to routine monitoring of contaminants in fish, ice and water, UFL intends to commence commercial analysis in the next financial year (2011/2012). However, for successful implementation of all planned activities in conformance to acceptable standards, there needs to be

an independent financial system that is flexible and can address anticipated problems more quickly. This is especially related to procurement of goods and services for laboratory smooth operations.

Washing of glass ware

Analysis of pathogens in biosafety

7. IMPLEMENTED DEVELOPMENT PROJECTS

7.1 Fisheries Development Project

The project which started in May 2003 was initially expected to end on 31st December 2008. However, due to delays in completion of the infrastructures, the project at Mid-Term Review was granted a 2-year extension with the revised completion date at 31st December 2010.

Expected Outputs and Achievements

Expected Outputs	Achievements
1. Expedite the construction process of the 17 Modern Landing Sites	• Construction Progress was also made on 17 landing sites at Kalangala (2), Bugiri (1), Mayuge (3) Busia (1), Kampala (1), Mukono (1), Masaka (1), Rakai (1), Buyende (1), Buliisa (1), Amorlatar (1), Serere (1), and Nakasongola (1). • Six of the landing sites on Lake Victoria were completed while the rest were rated at 80% completion. Improvements have also been done other landing sites on lakes Albert and Kyoga.
2. 21 model fish markets upgraded or established	• 20 Fish markets constructed • 4 completed and handed over to local governments
3. Equipment Quality Control Lab under DFR with sophisticated like: • Atomic absorption spectrometer for detection of heavy metals; • High performance liquid chromatography and gas liquid chromatography for estimation of pesticide residues and hydrocarbons • Microbiological equipments for detection of bacterial contamination.	• Procurement process ongoing, some deliveries made in the stores and at Kajjansi and Bushenyi
4. Expedite Rehabilitation of 4 Regional Fry production and Demonstration Centers	• Kajjansi Aquaculture Research and Demonstration Centre together with 3 Regional Fry Production and Aquaculture Demonstration centers (Mbale, Gulu and Bushenyi) completion rate at 90%.
5. Provided support equipment to FTI to enhance training activities	• One Omni bus procured for FTI
6. 5 ice plants cum cold stores established in 5 deserving fish landing sites	• Ice plants installed at Majanji, Gorofa, Bwondha, Bugoto, Mwena, Bukungu and Butiaba landing sites. Ice plants were also constructed at Nakasongola district headquarters and cold storage installed at Bakuli fish market.
7. Research into formulation of balanced fish feeds, hybridization of Tilapia, induced Catfish and Tilapia seed production and alternative aquaculture production systems undertaken	• Research in formulation of balanced fish feeds not undertaken due to failure to engage long term consultant. Research on hybridization of Tilapia and induced catfish and Tilapia seed production on-going in collaboration with some farmers in their farms due to delay in construction of ponds at Kajjansi

Figures 7.1: Infrastructure developed and equipment procured by the project

Constructed facilities at Namasale in Amolatar

Constructed shade at Mweena in Kalangala

The project officially closed on 31/12/2010. Details of the project are contained in the project completion report. Progress was also made on construction of landing sites with 17 fish landing sites at Kalangala (2), Bugiri (1), Mayuge (3) Busia (1), Kampala (1), Mukono (1), Masaka (1), Rakai (1), Buyende (1), Buliisa (1), Amorlatar (1), Serere (1), and Nakasongola (1). Six of the landing sites on Lake Victoria were completed while the rest were rated at 80% completion. Improvements have also been done other landing sites on lakes Albert and Kyoga.

Challenges:

During the early stage of project implementation, the project encountered a number of challenges which included:

(i) Meeting loan conditions such as obtaining land titles for the sites where the civil works were to be located;
(ii) Understanding and implementing GoU procurement guidelines introduced at that time;
(iii) Communication with the World Bank before opening of the country office;
(iv) Failure to operationalise the credit fund component.

At a later stage of implementation the project has also met other challenges which include;

(i) Escalation of construction costs leading to fewer facilities than what had been planned being constructed;
(ii) The budget that was allocated to the markets was too small requiring re-allocation from other components. Also not all the designed facilities could be provided at the markets and landing sites.
(iii) Low capacity of contractors both financially and in terms of equipment leading to slow implementation and in some cases termination of contracts due to failure to meet contractual obligations;
(iv) Heavy rains affecting pond construction at Kajjansi
(v) Poor responses to tenders for supply of hatchery and laboratory equipment requiring re-advertisement;
(vi) Delays in obtaining LC by the ice plant contractor leading to delayed completion of installation of ice plants and delayed starting to use the landing sites. This did not allow

the project time to operationalise the landing sites within the project time to observe the impacts.

Other challenges included:

(i) Inadequate manpower in the PCU. The staffs were attached to the project as additional assignment to other ministerial duties they were carrying out. The situation improved after recruitment of Procurement Assistant and assignment of a full-time Deputy Project Coordinator;

(ii) Inadequate release of counterpart funding which was supposed to cater for field operations of the PCU and district staff.

The project officially closed on 31/12/2010. Details of the project are contained in the project completion report.

7.2 Quality Assurance for Fish Marketing Project

The overall objective is to reduce poverty among fishing communities through improved quality and safety of fish for the domestic. Regional and export market as well as improving the livelihoods of fish dependent communities

Project title	Support to quality assurance for fish Marketing Project (QFMP)
Project code	1086
Project financing (donor)	Grant from Government of Iceland though Icelandic International development agency, (ICEIDA)
Project areas	Ntoroko, Hoima, Bullisa,& Nebbi on Lake Albert and Nakasongola, Apac , Amolatar ,Soroti(Serere) & Buyende
Project costs	Government of Iceland –US$-3.411.369 Government of Uganda -–US$-513.867 Amount spent -donor- US$ 700
Project period	**5 years, Start: April 2009**

The following outputs are expected to be realized through the Project activities:

(i) National Fish Inspectors and the Project Offices at Bugolobi renovated and furnished;

(ii) National Fish Inspectors and District Inspectors trained as district- and BMU trainers of trainers (TOT's);

(iii) BMU´s assembly members from nine districts around lake Albert and Kyoga trained in Functional Adult Literacy in BMU;

(iv) Nine district fisheries offices constructed or refurbished and equipped with transport and office furniture.

(v) Quality Assurance manual for CA prepared for the fisheries inspection services.

(vi) Districts fish inspectors refreshed in quality assurance, inspection and certification procedures and regional cooperation meetings/study tours attended by 10 inspectors per year

(vii) Clean water, sanitation and fish handling facilities established at selected 10 fishing landing sites in the 9 districts.

(viii) National and district fish inspectors trained in ICT and Information Management

(ix) Fisheries inspection database functional

(x) Code of Practice for artisanal fish processing and marketing prepared.

(xi) Code of Practice for fish farms prepared

Achievements

(i) Procured items for the inspectors as shown below.

No.	Item description	Quantity
1	Hp Laptops	8
2	Filling cabinets	10
3	Ice boxes (for sampling)	30
4	Digital thermometers	5
5	Packets of kits for hygiene and chlorine checks	10
6	Nylon cable ties (Seals) and Boxes of gloves	10 boxes
7	Self inking stamps	60
8	Pairs of gumboots	20
9	Overcoats	20

(ii) The double cabin pick up for DFR fish inspectors will be delivered in last week of May 2011;

(iii) Conducted National Fish Inspectors and District Fisheries Officers trained as district- and BMU trainers of trainers, TOTs;

(iv) BMU´s assembly members from nine districts around Lake Albert and Kyoga received extensive training in Functional Adult Literacy in BMU;

(v) 75% of BMU's in the districts of Nakasongola, Soroti, Apac and Amolatar have been trained. All BMU's in Buliisa and Ntoroko and a half of them in Hoima and Nebbi districts have also undergone training.

(vi) The training of BMU assembly members using the translated materials by the trained facilitators is ongoing on going in the nine districts.

	District	No. of BMU's	BMU's trained	Female	Male	FO's trained	CDO's trained	Totals trained
1	Amolatar	37	27	25	51	3	3	76
2	Apac	25	25	26	52	7	4	92
3	Soroti	30	15	15	30	6	2	53
4	Nakasongola	21	21	5	55	5	4	69
5	Buyende	21	10	15	30	6	6	79
6	Nebbi	28	14	8	36	2	2	44
7	Buliisa	9	9	8	24	2	2	32
8	Hoima	25	14	8	24	4	4	52
9	Ntoroko	3	3	5	19	1	1	24
	TOTALS	**199**	**138**	**115**	**321**	**36**	**28**	**521**

(vii) It financed the development and printing of the following BMU training materials:

a. 1000 copies of training manuals for trainees,
b. 1000 copies of instructors' guides
c. 500 copies of flip charts for class illustrations
d. 3000 copies of Book 1. BMU orientation and by-laws formation,
e. 3000 copies of Book 2. Financial management for BMU's and book keeping,
f. 3000 copies of Book 3. Planning for BMU's.

(viii) Nine District Fisheries Offices constructed or refurbished and equipped with a computer, printer, and office furniture (table, chairs and filing cabinet) internet/e 9 mail Modem and Motorcycle as follows;

(ix) Quality Assurance manual for CA prepared for the fisheries inspection services; the Department of Fisheries Resources is preparing the terms of reference for the consultancy.

(x) Have carried out four refresher training workshops for 60 fisheries staff from five districts,(Nakasongola, Kamuli, Amolotar, Apac and Soroti) around Lake Kyoga and twelve fisheries staff from the districts of Bundibugyo, Buliisa, Hoima and Nebbi on Lake Albert.

(xi) Clean water, sanitation and fish handling facilities established at selected 10 fishing landing sites in the 9 districts

(xii) Have constructed sanitation and fish handling facilities at Ntoroko and Kayei landing sites in Ntoroko and Apac districts respectively and provided them with water and Solar.Construction of the 3rd fish handling and mukene drying and storage facility in Tonya Hoima district is commencing June 2011

(xiii) National and district fish inspectors trained in ICT and Information Management; The project hired RCM International Ltd to carry out training of two district staff from each of the nine districts on basic computer applications.

(xiv) Fisheries inspection database functional; the project hired RCM International Ltd to develop a DFR database. The consultant installed the database system in DFR computers in December 2010 and is now carrying out training of data analyst and entrants.

(xv) Code of Practice for artisanal fish processing and marketing; and codes of practice for fish aquaculture value chain being developed together with the manual of Inspectors Guide.

Figure 7.2: Ntoroko Landing under Construction

Challenges to Implementation

(i) Delay in providing proof of land ownership and availability for proposed infrastructures by the districts;
(ii) Ever increasing prices of construction materials and other inputs which have affected the number fish handling facilities the project had planned to build;
(iii) Project is operating in fewer districts around Lake Kyoga, and hence its impact may be neutralized by the non- project district communities.

7.3 Uganda-Egypt Aquatic Weed Control Project

The main objective OF SFMAWC is to strengthen the current aquatic weed control program so as to be able to remove all barriers to fish production including provision of water for agricultural production and aquaculture development with a view of averting the current fish and food shortage in the country. In essence is to reduce aquatic weed infestation to levels that do not negatively impact to aquatic ecosystems.

Project title	Uganda-Egypt Aquatic Weed Control Project
Project financing (donor	Egypt
Project areas	Lake Victoria, Kagera river, Kyoga and Albert
Project period	**Continuous from 1994 to date**

Targets and Achievements:

Targets:

(i) To construct 12 agricultural water dams.
(ii) To develop 5 Fishermen landing sites.
(iii) To construct infrastructure for 4 aquaculture parks at (Kamuli, Namutumba, Busia, and Kabale).
(iv) To construct one water valley tank in Busoga area.
(v) Complete construction of the remaining 300 m marrum road at Kajjansi Fish Farm.
(vi) To carry out routine aquatic weed removal operation at the mouth of River Kagera.
(vii) To remove aquatic weeds from lakes Victoria, Kyoga and Albert.

The achievements so far include the following:

(i) Water dams for Agriculture
    a. Two dams (No. 4 and 5) in Lugusulu sub-county, Sembabule district, completed.
    b. One dam (Dajje) completed in Mpigi district.
    c. Two dams (Nabinoga and Kyabi) in Sembabule district, completed.
    d. One dam (Kifufu) in Sembabule district had its construction suspended due to too much water flow.
    e. One more dam (Lwembogo) in Ssemabule district was started on 22nd January 2011 and is yet to be finished.
(ii) Developing fishermen landing sites:
    a. Masese Landing Site works undertaken included; riprap construction for shoreline, two jetties have been completed, levelling of the top of landing site has been completed, construction of two sides started and cleaning shore water area started but not yet finished.
    b. Buvumbo Landing Site and water way has been completed.

c. Musa Landing Site (jetty and staging area) has been completed.
d. Buyiga Landing Site started.
e. Amorlator Landing Site is yet to commence.

(iii) Construction of Infrastructure of 4-aquaculture Park is yet to started.

(iv) Construction of Valley tanks in Busoga area has not yet started

(v) Construction of Kajjansi Road covering 300km of murram at Kajjansi Fish farm has not yet started.

(vi) Removal of aquatic weed at mouth of River Kagera is continuing.

(vii) Removal of aquatic weed from Lakes Victoria and Kyoga is continuing.

(viii) There was an influx of aquatic weeds at Dimo landing site in Masaka District and Awoja Bridge in Soroti District, this necessitated project machines to be transferred from their normal work to these places to alleviate the situation. *This led to a decision to reduce the number of dams which project must construct from 12 to 10 dams, 5 dams of which are completed and 2 under construction*.

(ix) Emergence Works:

a. Dimo landing site: Big masses of aquatic weeds blocked this landing site, caused death of some fishermen and stopped fishing activities, project equipment removed all weeds and rescued the landing site.
b. Awoja Bridge: Huge islands of aquatic weeds invaded this bridge during October 2010; project equipment removed the weeds and restored normal operations.

The project extension is coming to an end and the equipment for the phase has not yet been delivered. There is urgent need to follow up on this procurement. A project US $ 5 M concept was submitted to Cairo for a 3-year extension and response still awaited.

7.4 Support Fisheries Mechanization and Weed Control

Project title	Support Fisheries Mechanization and weed Control
Project areas	Lake Victoria, Kagera river, Kyoga and Albert
Project period	**Continuous from 1994 to date**

The specific objectives of this project included:

(i) the removal of barriers to fisheries production i.e. suds, siltation, weeds at landing sites in major water bodies and fish nursery/breeding areas and satellite lakes and rivers in order to support fish production;

(ii) establishment and equipping of five regional fisheries/agricultural mechanized units in east, west, central, headquarters and north for support to fisheries/food production and aquatic weed control;

(iii) Establish on farm community reservoirs to provide water for animals and be stocked for increased fish production while also acting as demonstration centers for irrigation for crop production;

(iv) Build capacity of stakeholders in aquatic weed control and monitoring, irrigation, aquaculture and fisheries management;

(v) Establish aquaculture parks in selected aquaculture zones.

Planned Activities for FY 2010/11:

(i) Manual and mechanical removal of aquatic weeds at sites of strategic importance (transport piers, fish handling infrastructure and fishing grounds, hydro electric dams).
(ii) Construction of aquaculture, livestock and crop production infrastructure (ponds and dams)
(iii) Train stakeholders in weed and fisheries management practices
(iv) Support to small scale and large scale farmers[2]
(v) Participating in regional collaboration meetings , workshops and exchange visits for handling management of trans-boundary environmental problems
(vi) Establish and maintain weevil rearing stations for biological control of aquatic weeds

The status of physical infrastructure under this project is:
(i) Three staging areas in Lake Victoria.
(ii) Thirteen staging areas in Lake Kyoga.
(iii) Two staging areas in Lake Kwania.
(iv) Staging areas in Lake Albert.
(v) Widening the main channels from 250 m to 400 m.
(vi) Four water dams in Kitgum
(vii) Four water dams in Ssembabule
(viii) Road works undertaken on road branch to Kajjansi ARDC
(ix) Kabaka's lake de-silted and restored

The challenges to the project included:
(i) Lack of GoU funding led to accumulation of arrears in terms of government obligations to the donors.
(ii) High demand for works in water for production against the limited and unsuitable equipment for such works.

GoU funding has been solicited and 400m expected in 2010/2011. One bulldozer suitable for construction of dams is under procurement. There are plans to exchange the dredger with more suitable equipment. A cost sharing process has been initiated with farmers providing costs for fuel and project, providing machines and expertise to construct the dams. A long-term project plan is under preparation for sustainability of the program

7.5 Mukene for Human Consumption Project

The primary objective of this project is to practically implement the findings of extensive research and facilitate by appropriate training and practical demonstration, the improvement in product quality by the artisanal fisheries sector. The specific objectives include:
(i) Implementing a pilot project that demonstrates proven catamaran technology to fish further offshore,
(ii) Assisting the government in preparing the policy, strategy and management plans for Mukene fisheries,
(iii) Assisting the government in improving the existing Mukene processing (sun drying) and developing new fishery products based on improved Mukene handling, processing and packaging. Facilitate cross-fisheries sectoral stakeholder workshops.
(iv) Assessing the economic and operational feasibility of the fishing and processing operations in order to guide the development of the policy strategy and management plans for Mukene fisheries in Uganda.

[2] Provide equipment to farmers for construction of ponds and dams on cost sharing basis

Marketing and Processing

(i) Preparation of regulations the manufacture of animal feeds was ongoing to be completed in April, sensitization the feed produced completion of regulation, efforts are on to provide credit for women to improve the hygiene standards;

(ii) Two Mukene sun dying, deep frying and smoking demonstration facilities had been constructed at Kashekulo and Kiyindi;

(iii) Five Mukene drying racks ready for installation at Katebo, Kiyindi and Kikondo landing sites under GOU financing;

(iv) New products were developed by FBRC with backstopping of the international consultant on product development;

(v) Two women's groups were trained in hygienic processing of traditional products but are yet to be trained on new products. The socio-economic feasibility of these products to be tested and sound commercial partnerships established with potential buyers, including the feed producers

Mukene Capture Fisheries

(i) Two catamaran boats constructed and handed over to government, a 3rd catamaran was under construction at FTI and the 4th one under procurement processes;

(ii) 10 Fishermen were trained in manning catamaran boats/safety;

(iii) Fishing equipment and gear were procured;

(iv) Mukene fishing demonstrations undertaken with catamaran boats in Wakiso and Buikwe waters using 8 and 10mm mesh size nets;

(v) Biological data was collected for comparison of 5mm, 8mm and 10mm in shallower and deeper waters ;

(vi) A draft policy and strategy document was in place by the National Fisheries Biologist and a Management plan was being developed in consultation with stakeholders.

(vii) A Communication plan for Mukene issues was being drafted by the communication expert.

Increased Mukene for Human Consumption

(i) The DFR has developed a draft Mukene Policy and Management Plan that is being enriched to include all the small fish species that have of recent emerged as a major fishery following the decline in Nile perch and Nile Tilapia fishery;

(ii) Seven artisans community processing infrastructure (drying racks, dip frying and smoking kilns) were constructed for Mukene processing at Katebo (Mpigi) and Kikondo and Kiyindi (Buikwe) and Katosi (Mukono) and Kasekulo (Kalangala) landing sites on Lake Victoria

(iii) Other infrastructure completed for community use included 20 urban and rural fish markets in various Districts. Fish handling structures were also constructed in Ntoroko and Kayei landing sites in Ntoroko and Apac districts respectively under QFMP.

(iv) Practical training was conducted for women fish processors at Kiyindi (Buikwe) and Kashekulo (Kalangala) on improved fish processing methods. The two women groups are now processing and packing Mukene for sale in super markets. Kyoga basin has undergone comprehensive training for fishers and processors in quality assurance and fish handling.

(v) TOT's was conducted for inspectors on quality assurance techniques and other QA related issues in the districts of Buyende, Nebbi, Hoima, Bullisa, Ntoroko, Soroti,

Amolatar, Apac and Nakasongola. Capacity building was undertaken for 15 Local Fish Inspectors and 15 commercial fish farmers in central and western Uganda;

(vi) Value addition was promoted with development of new mukene products namely sweet mukene, chips mukene, simsim mukene and powdered mukene. These products need to be popularized for the private fisheries sector to adopt and develop for marketing. Guidelines for sanitary handling of mukene animal feed were developed in order to improve on the handling and quality along the value chain

The following challenges are constraining implementation:

(i) Need for regional harmonization of policy issues being advanced;

(ii) The project is complex and a socio economic analysis of the events required, there is need for recruitment of socio economist to study the economics and cost benefit analyses

(iii) The project life span is short to comprehensively address all activities and upcoming issues;

(iv) The management plan developed needs to piloted or tested.

(v) Sustainability of fishing operation has to be addressed

8. CHALLENGES TO FISHERIES MANAGEMENT

The following still remain challenges in the fisheries sub sector;

(i) Inadequate knowledge on the status of fish stocks in all water bodies on which to establish sustainable levels of fishing;
(ii) Department not incorporating annual plans from BMU because BMU's have been handicapped to get their annual plans adopted by districts for translation into national plans Loss of biodiversity;
(iii) Lack of adequate facilities for seed multiplication and artificial propagation for restocking and stock enhancement; Lack of species-specific management plans;
(iv) Breeding and nursery grounds are not identified, mapped and gazetted; Inadequate capacity of BMUs in fisheries management;
(v) The resurgence of water hyacinth and the emergence of new weeds;
(vi) Prevalence of HIV/AIDS in the fishing communities;
(vii) Inadequate exposure and mechanisms for fishing communities to save and invest;
(viii) Lack of clear understanding on the economics of fisheries development;
(ix) Increased fishing pressure due to increased population;
(x) Decline in bigger species of higher commercial value which are being replaced by smaller species of low commercial value;
(xi) Continued use of illegal gears and methods;
(xii) Poor data collection due to limited resources to cover a number of water bodies with many scattered small fish landing centers;
(xiii) Lack of coordination between various stakeholders; Non Government organizations and the competent authority (DFR). There is need for a bill to regulate all organizations involved in aquaculture activities by the Fisheries Department as the competent authority and as focal point for aquaculture in the country;
(xiv) Lack of capital for investment in aquaculture and lack of organized market for farmed fish; Expensive and unaffordable inputs especially fish feed. Lack of feeds to sustain the real opportunities in aquaculture;
(xv) Climatic changes remain a threat to the fishing and aquaculture development in the country and inadequate infrastructure for food safety and quality assurance.

9. WAY FORWARD AND FUTURE INTERVENTIONS

There is need to ensure financial, technical and administrative support to aquaculture in order to bridge the gap created currently of fish scarcity and increase production in Uganda and the entire region. Aquaculture production should be given the same priority as other agriculture fisheries sectors since it contributes to the livelihoods of all livelihood categories in the social setup of Uganda. Government should look forward into supporting aquaculture by engaging in direct interventions to build capacity for aquaculture production and provision of quality water for aquaculture production e.g. through bulk water transfer systems.

There is also need for putting in place subsidies to support development of aquaculture parks. This could be directly tackled through capital injection and tax levies on aquaculture materials and services within this required period. Provision of low interest lending to aquaculture practitioners to provide capital for aquaculture production. Build the capacity of aquaculture personnel and practitioners through training, exposure study tours. Response Strategy and Action Plan is required for climate change.

To reverse the declining fortunes of the industry, interventions are urgently required to halt illegal activities and to exploit existing opportunities. Under the DSIP, Government is focusing on strengthening controls of illegal fishing, promoting and supporting aquaculture and cage farming, especially of tilapia (currently at negligible levels but with clear potential for export to neighboring countries, and stocking of small water bodies including dams. Emphasis is also on ensuring fish quality at all levels.

There is need for investment in infrastructure for storage and marketing of processed Mukene and other small fishes considering that establishment of community processing infrastructure can only improve Mukene processing and yet quality can deteriorate during, storage and marketing. Credit facilities are also required targeting women in the fisheries sector who form the majority in the processing fisheries sector.

The main focus for the fisheries sector should be provision of on farm water for fisheries production based on the experiences from the UEAWCP implement by DFR. While we promote aquaculture development, there is need for restocking of our water bodies to boost production and meet the fish food requirement

ANNEX I: Resource Persons and Contacts

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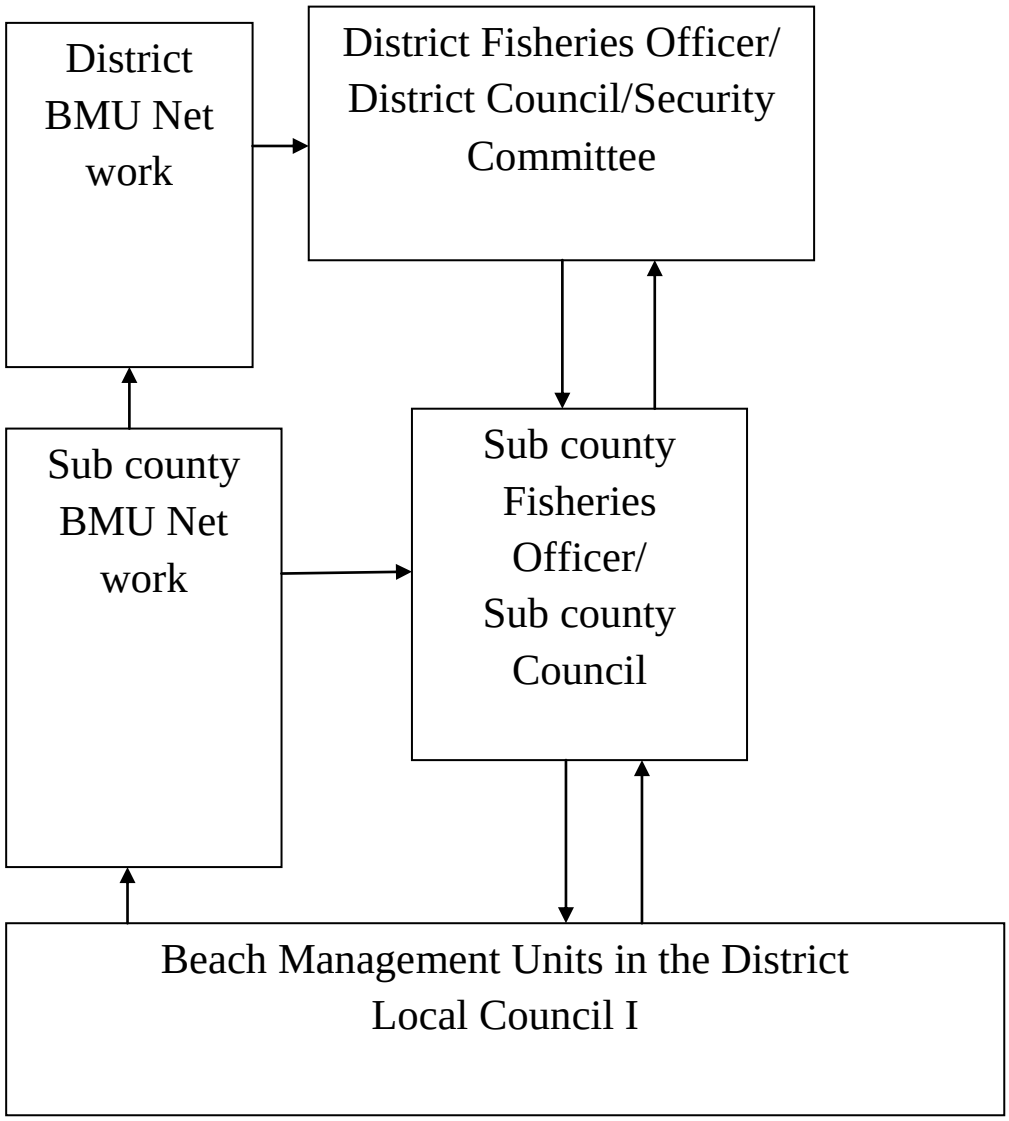
ANNEX II: Structure for Fisheries Management in Local Governments



ANNEX III: Diagram of the Structure of Department of Fisheries Resources